

CLAIMS

1. A variable geometry turbine comprising a turbine wheel supported in a housing for rotation about a turbine axis, an annular inlet passage way extending radially inwards towards the turbine wheel, the annular inlet passageway being defined between a radial wall of a moveable wall member and a facing wall of the housing, the moveable wall member being mounted within an annular cavity provided within the housing and having inner and outer annular surfaces, the wall member being moveable axially between first and second positions to vary the width of the inlet passage way, the second axial position being closer to the said facing wall of the housing than the first axial position, the moveable wall member having a first annular flange extending axially from the radial wall into said cavity in a direction away from said facing wall of the housing, a first annular seal being disposed between said first annular flange and the adjacent inner or outer annular surface of the cavity, said first annular seal being mounted to one of said first annular flange or said adjacent annular surface of the cavity;

wherein one or more inlet bypass passages are provided in the other of said first annular flange and said adjacent cavity surface, such that said first annular seal and bypass passageways move axially relative to one another as the moveable wall member moves between said first and second positions; and

wherein said first annular seal and the or each bypass passage are axially located such that with the annular wall member in said first position the seal prevents exhaust gas flow through the cavity but with said moveable wall member in the second position the or each bypass passage permits the flow of exhaust gas through said cavity to the turbine wheel thereby bypassing the annular inlet passageway.

2. A variable geometry turbine according to claim 1, wherein the annular seal is mounted to said annular surface of the cavity, and the or each bypass passage comprises an aperture through said first annular flange of the moveable wall member.

3. A variable geometry turbine according to claim 2, wherein the annular seal is located within an annular groove provided within said annular surface of the cavity.
4. A variable geometry turbine according to claim 1, wherein said annular seal is mounted to said first annular flange, and the or each bypass passage comprises a recess provided in the adjacent annular surface of the cavity.
5. A variable geometry turbine according to claim 4, wherein said annular seal is located within an annular groove provided in an outer surface of said first annular flange.
6. A variable geometry turbine according to claim 1, wherein said first annular flange extends axially from the radially outermost periphery of the radial wall of the moveable wall member, and said first annular seal is disposed between the first annular flange and said outer surface of the cavity.
7. A variable geometry turbine according to claim 6, wherein said moveable wall member comprises a second annular flange extending axially into said cavity from the radially innermost periphery of the radial wall, and a second annular seal is mounted to one of said second annular flange or said inner annular surface of the cavity, and one or more inlet bypass passages are provided in the other of said second annular flange and said inner cavity surface.
8. A variable geometry turbine according to claim 7, wherein apertures are provided through said radial wall of the moveable wall member whereby the cavity is in fluid communication with the inlet passageway, said apertures being arranged such that in use a resultant force is exerted on the moveable wall member which force is always in a single axial direction.

9. A variable geometry turbine according to claim 1, wherein when the moveable wall member is in said second position the width of the inlet passageway is at a minimum.
10. A variable geometry turbine according to claim 1, wherein when the moveable wall member is between said first position and a third position intermediate the first and second positions the or each seal prevents flow of gas through said cavity via said bypass passages, and wherein when said moveable wall member is between said third position and said second position said bypass passages permit the flow of gas through said cavity, and wherein said third position is closer to said second position than to said first position.
11. A variable geometry turbine according to claim 10, wherein the positions between said first and third positions correspond to a normal high efficiency operating mode of the turbine, and positions between said third and second position correspond to an exhaust braking mode of operation of the turbine.
12. A variable geometry turbine according to claim 1, comprising a plurality of said bypass passages circumferentially arranged around the respective annular flange or annular cavity surface.
13. A variable geometry turbine according to claim 1, comprising nozzle vanes extending into the inlet passage way.
14. A variable geometry turbine according to claim 1, wherein said nozzle vanes extend from said nozzle ring.
15. A turbocharger comprising a variable geometry turbine according to any preceding claim.

16. A turbocharged internal combustion engine comprising a turbocharger according to claim 13.

17. A powered vehicle comprising a turbocharged internal combustion engine according to claim 14, wherein operating said turbocharger with the annular wall member at or adjacent said second position provides an exhaust braking function.